

# UNDERWATER BRIDGE INSPECTION REPORT

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STRUCTURE NO. 7208

CSAH NO. 13

OVER THE

BLUE EARTH RIVER

DISTRICT 7 - BLUE EARTH COUNTY

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PREPARED FOR THE  
MINNESOTA DEPARTMENT OF TRANSPORTATION

BY

COLLINS ENGINEERS, INC.

JOB NO. 5221 (CEI 137)

MINNESOTA DEPARTMENT OF TRANSPORTATION  
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge No. 7208, Piers 2 and 3, were generally in good condition with no defects of structural significance observed. The top of the webwall exhibited areas of section loss at both piers with exposed reinforcing at Pier 2. A moderate to heavy accumulation of timber drift was present across the upstream end of Pier 3. A large 30-foot-long log was observed at the upstream end of Pier 2. A scour depression was also observed at the upstream end of Pier 2. The channel bottom appeared stable with no appreciable changes since the previous inspection.

INSPECTION FINDINGS:

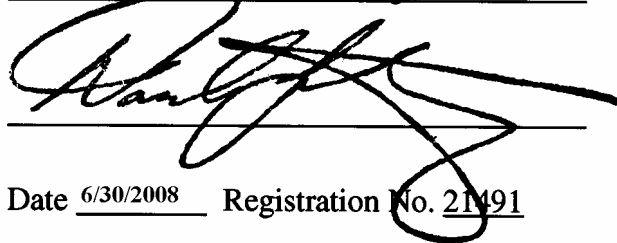
- (A) An area of section loss, 1.5 foot high and extending the entire width of Pier 2 was observed along the top corner of the webwall at the upstream end with a maximum penetration of 6 inches and exposed reinforcing steel.
- (B) An area of section loss, 7 inches high and 12 inches long, was observed at the top corner of the webwall at the upstream end of Pier 3 with 1 inch of penetration.
- (C) A log, 1 foot in diameter, was observed at the upstream end of Pier 2, resting on the webwall.
- (D) A scour depression, 3 feet deep and 6 feet in radius, was observed at the upstream end of Pier 2.
- (E) A piece of steel sheet piling was observed at the downstream end of Pier 2 extending from the channel bottom to 1 foot above the waterline.
- (F) A moderate to heavy accumulation of timber debris consisting of logs 1.5 feet in diameter and smaller was observed at the upstream end of Pier 3 extending from the easterly shoreline to the upstream column and resting on the webwall.

RECOMMENDATIONS:

- (A) The corner spall in the top of the web wall at Pier 2, which has exposed reinforcing steel, should be monitored at the minimum. If found to be progressing in size, the area should then be repaired by removing all unsound concrete, cleaning the exposed reinforcing steel, and patching with a concrete mix designed to promote high durability and low permeability.
- (B) Monitor the timber debris at Piers 2 and 3, and if found to be increasing in the future, removal operation may become warranted.
- (C) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

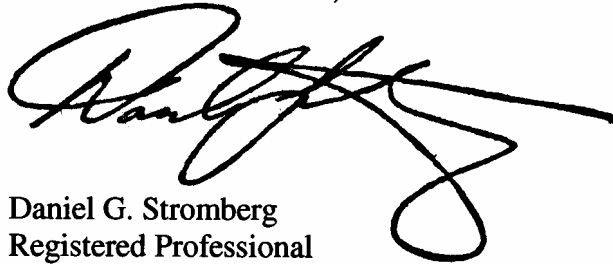
Daniel G. Stromberg



Date 6/30/2008 Registration No. 21491

Respectfully submitted,

COLLINS ENGINEERS, INC.



Daniel G. Stromberg  
Registered Professional  
Engineer, State of Minnesota

MINNESOTA DEPARTMENT OF TRANSPORTATION  
UNDERWATER BRIDGE INSPECTION

1. BRIDGE DATA

Bridge Number: 7208

Feature Crossed: Blue Earth River

Feature Carried: CSAH No. 13

Location: District 7 - Blue Earth County

Bridge Description: The superstructure of Bridge No. 7208 consists of a four span concrete beam structure supporting a reinforced concrete deck. The superstructure is supported by two concrete abutments and three concrete piers, numbered 1, 2, and 3 starting from the west. The abutments and piers are founded on steel H-piles.

2. INSPECTION DATA

Professional Engineer/Team Leader: Daniel G. Stromberg, P.E., S.E.

Dive Team: Clayton G. Brookins, Valerie Roustan

Date: November 20, 2007

Weather Conditions: Cloudy, 48°F

Underwater Visibility: 3.0 feet

Waterway Velocity: 2.0 f.p.s.

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 2 and 3

General Shape: The piers consisted of two round concrete columns connected on the lower half by a concrete web wall. The piers are each supported by two rectangular concrete footings founded on steel H-piles centered on the columns.

Maximum Water Depth at Substructure Inspected: Approximately 5.3 feet.

4. WATERLINE DATUM

Water Level Reference: The top of the pier cap on the north end of Pier 2.

Water Surface: The waterline was approximately 18.0 feet below reference.  
Waterline Elevation = 951.6.

5. NBIS CODING INFORMATION (Minnesota specific codes are used for 92B and 113)

Item 60: Substructure: Code 7

Item 61: Channel and Channel Protection: Code 6

Item 92B: Underwater Inspection: Code B/11/07

Item 113: Scour Critical Bridges: Code J/91

Bridge is scour critical because abutment or pier foundation is rated as unstable due to observed scour at bridge site.

       Yes   X   No





Photograph 1. Overall View of the Structure, Looking Southeast.

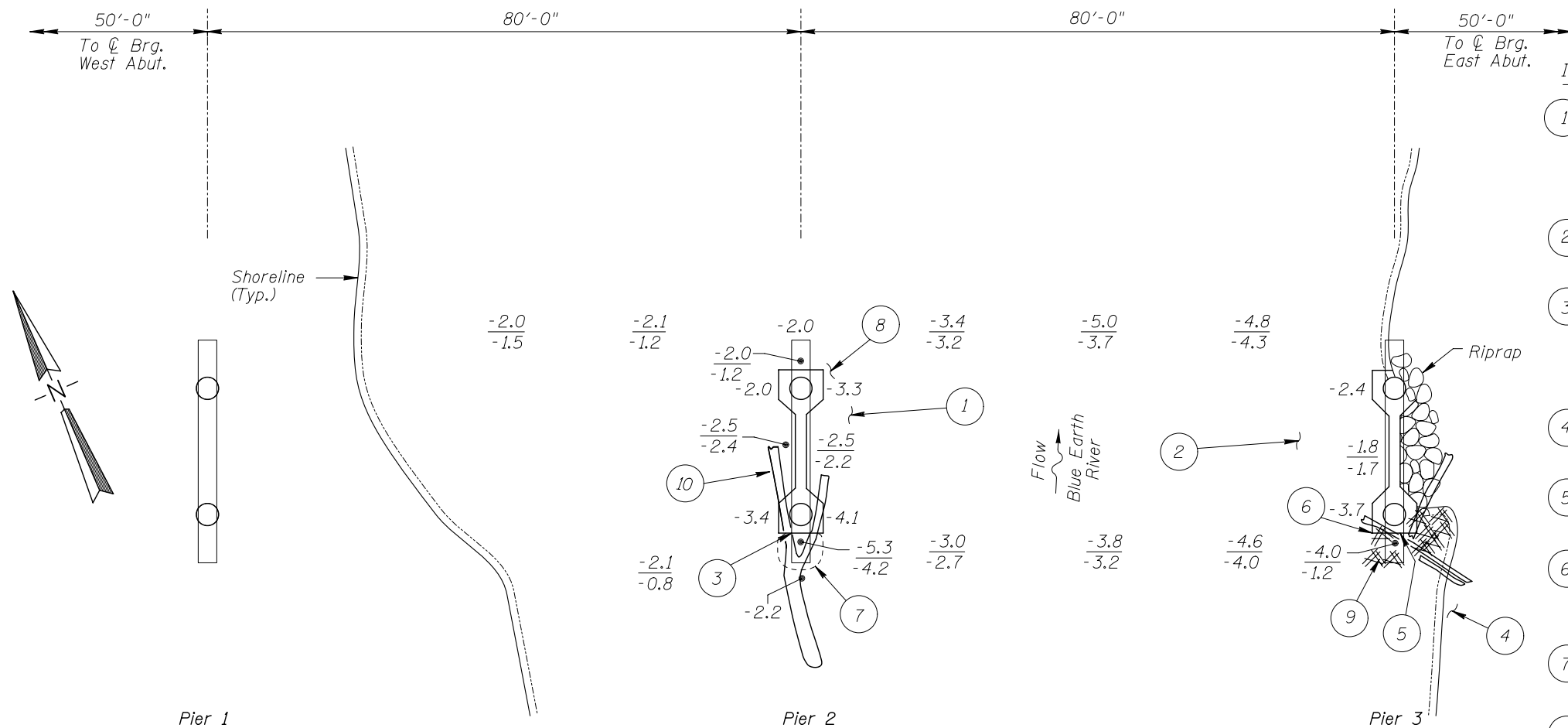


Photograph 2. View of Pier 3, Looking North.

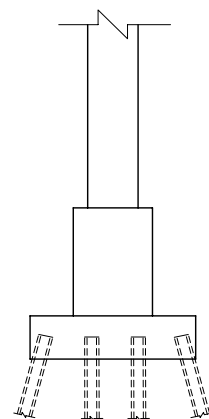


Photograph 3. View of Pier 2, Looking Southeast.





SOUNDING PLAN



TYPICAL END VIEW OF PIERS

GENERAL NOTES:

- Piers 2 and 3 were inspected underwater.
- At the time of inspection on November 20, 2007, the waterline was located approximately 18.4 feet below the top of the pier cap at the downstream end of Pier 2. This corresponds with a waterline elevation of 951.6.
- Soundings indicate the water depth at the time of inspection and are measured in feet.
- Soundings were taken parallel to the bridge at 1/4 point intervals between the substructure units.

Legend

- 2.0 Sounding Depth (11/20/07)  
-5.2 Sounding Depth (11/2/02)

Timber Debris

Note:

All soundings based on 2007 waterline location.

INSPECTION NOTES:

- The channel bottom at Pier 2 consisted of silty sand and gravel on the west side and riprap, up to 2 foot in diameter, along the east side and upstream nose. When possible, there was up to 6 inches of maximum probe rod penetration.
- The channel bottom consisted of cobbles up to 1 foot in diameter with no appreciable probe rod penetration.
- An area of section loss, 1.5 foot high and extending the entire width of Pier 2 was observed at the top corner of the webwall at the upstream end with a maximum penetration of 6 inches and vertical exposed reinforcing steel at the corners.
- Moderate erosion of the embankment was observed at the upstream end of Pier 3.
- A hairline crack was observed at the upstream end of Pier 3 extending from the top of the webwall to the channel bottom.
- An area of section loss, 7 inches high and 12 inches long, was observed at the top corner of the webwall at the upstream end of Pier 3 with 1 inch of penetration.
- A scour depression, 2 feet deep and 7 feet in radius, was observed at the upstream end of Pier 2.
- A piece of steel sheet piling was observed at the downstream end of Pier 2 extending from the channel bottom to 1 foot above the waterline.
- A moderate to heavy accumulation of timber debris consisting of logs and branches 1.5 feet in diameter and smaller was observed at the upstream end of Pier 3 extending from the shoreline to the upstream column and resting on the webwall.
- A large, 30-foot-long log, 1 foot in diameter, was forked on the upstream column of Pier 2 resting on webwall.

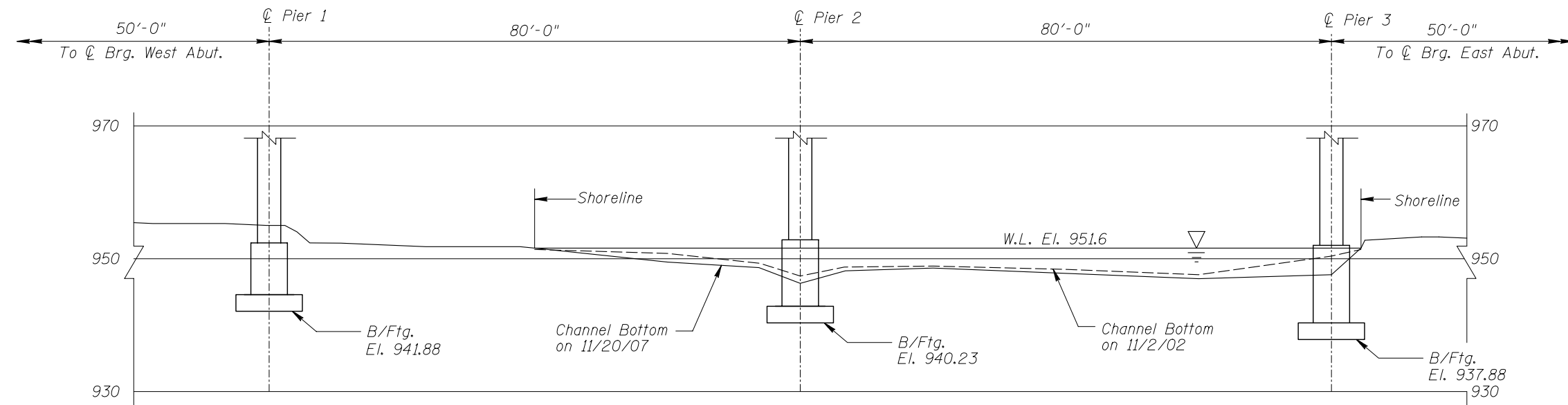
**MINNESOTA  
DEPARTMENT OF TRANSPORTATION  
UNDERWATER BRIDGE INSPECTION**

STRUCTURE NO. 7208  
OVER THE BLUE EARTH RIVER  
DISTRICT 7, BLUE EARTH COUNTY

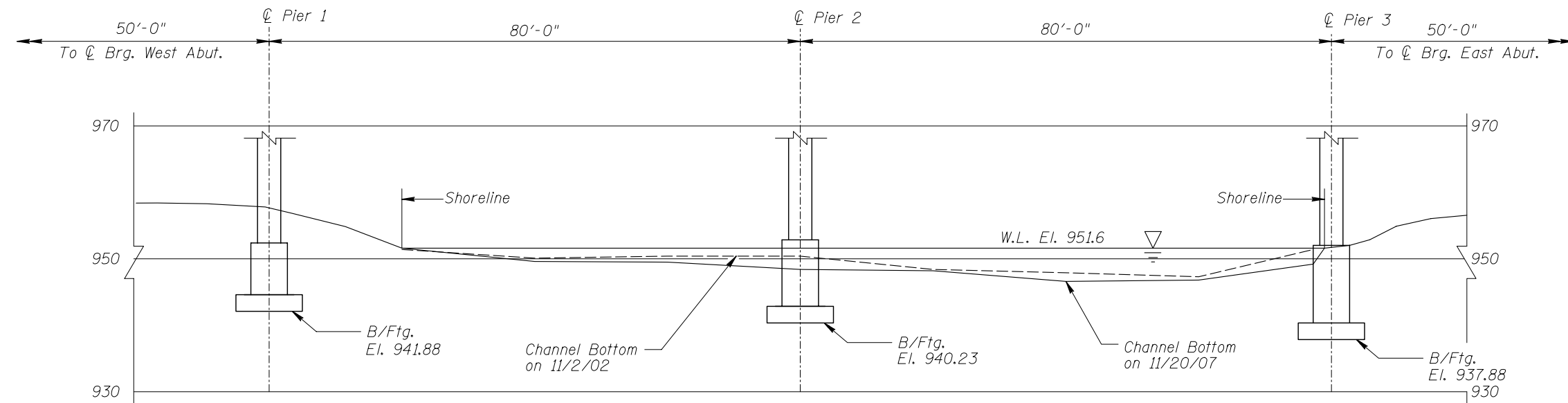
**INSPECTION AND SOUNDING PLAN**

Drawn By: PRH	<b>COLLINS ENGINEERS</b>	123 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com	Date: NOV., 2007
Checked By: MDK			Scale: NTS
Code: 52210137			Figure No.: 1





UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Note:  
Refer to Figure 1 for General Notes.

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 7208 OVER THE BLUE EARTH RIVER DISTRICT 7, BLUE EARTH COUNTY UPSTREAM AND DOWNSTREAM FASCIA PROFILES		
Drawn By: PRH	<b>COLLINS</b> <b>ENGINEERS</b> <small>123 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Date: NOV., 2007
Checked By: MDK		Scale: 1"=20'
Code: 52210137		Figure No.: 2

MINNESOTA DEPARTMENT OF TRANSPORTATION  
OFFICE OF BRIDGES AND STRUCTURES  
DAILY DIVING REPORT

INSPECTORS: Collins Engineers, Inc. DATE: November 20, 2007  
ON-SITE TEAM LEADER: Daniel G. Stromberg, P.E., S.E.  
BRIDGE NO: 7208 WEATHER: Cloudy, 48°F  
WATERWAY CROSSED: The Blue Earth River  
DIVING OPERATION: ☒ SCUBA ☐ SURFACE SUPPLIED AIR  
☒ OTHER Low water permitted inspection by wading  
PERSONNEL: Clayton G. Brookins, Valerie Roustan  
EQUIPMENT: Scuba, Scraper, Sounding Pole, Probe Rod, Lead Line, Camera  
TIME IN WATER: 8:45 A.M.  
TIME OUT OF WATER: 9:15 A.M.  
WATERWAY DATA: VELOCITY 2 f.p.s.  
VISIBILITY 3 feet  
DEPTH 5.3 feet maximum at Pier 2  
ELEMENTS INSPECTED: Piers 2 and 3  
REMARKS: The concrete of Piers 2 and 3 was generally in good condition with no structurally significant defects observed. The top of the webwall exhibited areas of section loss at both piers with exposed reinforcing at Pier 2. A large log, 1 foot in diameter, was forked on the upstream column of Pier 2 resting on the webwall. A scour depression, 3 feet deep and 6 feet in radius, was also observed at the upstream end of Pier 2. A moderate to heavy accumulation of timber debris, consisting of logs 1.5 feet in diameter and smaller, was observed at the upstream end of Pier 3 extending from the easterly shoreline to the upstream column and resting on the webwall.  
FURTHER ACTION NEEDED: ☒ YES ☐ NO

The corner spall in the top of the web wall at Pier 2, which has exposed reinforcing steel, should be monitored at the minimum. If found to be progressing in size, the area should then be repaired by removing all unsound concrete, cleaning the exposed reinforcing steel, and patching with a concrete mix designed to promote high durability and low permeability.

FURTHER ACTION NEEDED CONTINUED:

Monitor the timber debris at Piers 2 and 3, and if found to be increasing in the future, removal operations may become warranted.

Reinspect the submerged substructure units at the normal maximum recommended interval of five (5) years.

MINNESOTA DEPARTMENT OF TRANSPORTATION  
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 7208  
INSPECTORS Collins Engineers, Inc.  
ON-SITE TEAM LEADER Daniel G. Stromberg, P.E., S.E.  
WATERWAY CROSSED Le Sueur River

INSPECTION DATE November 20, 2007

NOTE: USE ALL APPLICABLE CONDITION DEFINITIONS AS DEFINED IN THE MINNESOTA RECORDING AND CODING GUIDE INCLUDING GENERAL, SUBSTRUCTURE, CHANNEL AND PROTECTION, AND CULVERTS AND WALL DEFINITIONS TO COMPLETE THIS FORM.

CONDITION RATING

UNIT REFERENCE NO.	UNIT DESCRIPTION	MAXIMUM DEPTH OF WATER	SUBSTRUCTURE						CHANNEL					GENERAL					
			PILING	COLUMNS, SHAFTS, OR FACES*	FOOTINGS	DISPLACEMENT	OTHER (DIAPHRAGM)	OVERALL SUBSTRUCTURE CONDITION CODE*	SCOUR	EMBANKMENT EROSION	EMBANKMENT PROTECTION	OTHER (DRIFT/DEBRIS)	OVERALL CHANNEL & PROTECTION CONDITION	CONCRETE	STEEL	TIMBER	LOSS OF SECTION	PREVIOUS REPAIR OR MAINTENANCE	OTHER
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	Pier 1	5.3'	N	7	N	9	N	7	6	N	N	7	6	7	N	N	N	N	N
	Pier 2	4.0'	N	7	N	9	N	7	7	7	8	6	6	7	N	N	N	N	N

\*UNDERWATER PORTION ONLY

REMARKS: The concrete of Piers 2 and 3 was generally in good condition with no structurally significant defects observed. The top of the webwall exhibited areas of section loss at both piers with exposed reinforcing at Pier 2. A large log, 1 foot in diameter, was forked on the upstream column of Pier 2 resting on the webwall. A scour depression, 3 feet deep and 6 feet in radius, was also observed at the upstream end of Pier 2. A moderate to heavy accumulation of timber debris, consisting of logs 1.5 feet in diameter and smaller, was observed at the upstream end of Pier 3 extending from the easterly shoreline to the upstream column and resting on the webwall.

NOTES: ATTACH SKETCHES AS NEEDED, IDENTIFY REMARK BY REFERRING TO UNIT REFERENCE NO. AND REMARK NO. USE GENERAL SECTION TO IDENTIFY OVERALL PRESENCE OF SPALLS, CRACKS, CORROSION, ETC.